

Transboundary Gas Group Meeting Notes

October 13-14, 2004
Penticton Lakeside Resort
Penticton, B.C.

1. Greetings and Introductions.

Mark Schneider of NOAA Fisheries and Daniel Millar of Environment Canada welcomed everyone to the meeting, held October 13-14, 2004 at the Penticton Lakeside Resort in Penticton, B.C. Millar led a round of introductions and a review of the agenda. Schneider asked anyone with corrections to the last TGG meeting minutes to submit them to him as soon as possible.

The following is a distillation (not a verbatim transcript) of the items discussed and decisions made at this meeting. Anyone with questions about this summary should contact Kathy Ceballos at 503/230-5420.

2. B.C. Hydro Update.

Gary Birch said B.C. Hydro is working at Mica and Revelstoke. He noted that the spillways of these projects have not been used since 1977 and 1993 respectively. Gas production at these plants is not related to the spillway; it is related to “synchronous condensing”. The period in which that mode is used can be fairly lengthy – 54 days at Revelstoke in 2004, for example. Both plants produce very high TGP levels when in prolonged synchronous condensing mode.

In 1996 there was a fish kill below Mica; the fish were found to have suffered from GBT. A series of spot samples was done following that kill; the highest TGP level recorded directly below one of the units was 200%. Below Revelstoke, levels have been recorded in the high 130% range. He noted that, up until 4-5 years ago, compressed air was introduced to some of the units to reduce cavitation; that practice has since been discontinued. In response to a question, Birch explained what “synchronous condensing” is. It involves pumping compressed air into the scroll casing, and the lack of seals on the wicket gates, which introduces water into the units. That water absorbs gas almost instantly, and is then released into the river below the project. Birch noted that, while gas levels immediately below the units tend to be very high under prolonged synchronous condense mode, that effect is localized, and doesn’t persist very far downstream. Two units at Mica and four at Revelstoke are equipped to operate in synchronous condense, which is employed to reduce maintenance on the units and to allow greater load

control.

This year, we were able to do the first continuous monitoring below Revelstoke, with hourly measurements collected from February to December at three stations, Birch continued. The results showed the highest measurement was 157%; the average through the year was 120-130%. Five hundred meters downstream, that average was generally below 120%; 5 kilometers downstream, about 110%. We're not sure what we're going to do about that, said Birch; it looks as though we will be running four units, rather than two, in synchronous condense more frequently. We will be doing some additional continuous monitoring at Revelstoke in 2005.

We're also going to be working at Mica in 2005; where no unit will run in synchronous condense for more than 12 hours, followed by a flushing process that costs \$10,000 in lost generating revenue – it is not inexpensive. We will be doing continuous monitoring during the synchronous condense period at Mica, looking both to see how frequent periods of 200% TGP really are, and how effective the flushing is at reducing TGP. We're also planning to do some work at Sevenmile on the Pend Oreille River in 2005, Birch said.

3. Columbia Power Corp. Update.

Llewellyn Matthews updated the group on CPC's recent TGP activities at Arrow Lakes, Brilliant, the Brilliant Expansion Project, and at Waneta. At Arrow Lakes, there was an incident when the intake channel to the powerplant failed; as a result, the Arrow Lakes generating station was offline from April 30 through August 2. During that period, the water that normally would have passed through the turbines instead went through Keenleyside Dam. He explained the cause of the failure, and how it was repaired. He said the repair appears to be adequate and the plant is now operating at full capacity. Although CPC is still analyzing whether the interim repair is sufficient or a more permanent repair is needed. TGP levels during the outage were higher than normal, up to 123.5% during parts of July.

The Brilliant Expansion is under construction, scheduled for completion and operation in August 2006. At Waneta, an environmental assessment on a potential expansion project is under way. Some preliminary results are available. An EA will be filed in March 2005; at that point, the study results will be available for review and comment. The study was done in two parts: first, to develop a model of TGP production at Waneta, and second, to determine what the improvement in TGP levels might be at the U.S./Canadian border if the expansion proceeds. A monitoring station was established at Ft. Shepherd, just below the confluence of the Pend Oreille and the Columbia; another station was installed in the Waneta forebay, and another at Northport. In developing the model and analyzing the data, some problems occurred, including vandalism at one of the stations. Also, there were problems in developing the model – for example, this was a low runoff year, which limited our spillway releases. However, it does appear that peak TGP production was achieved. In using the mass/balance approach, small errors in accuracy tend to magnify, which is another problem.

In terms of results, at high TGP flows, spillway production was getting up into the 150%+ range, especially at Waneta Spillway 3. Model validation tests were conducted, resulting

in lack of confidence in the spillway equations. Therefore, CPC is unable to recommend any change to spillway gate operation at this time – more data will be needed.

Part 2 of the study was to try to get a handle on TGP production at the U.S./Canada border, Matthews continued; he explained the modeling approach used to develop this assessment, including the pre-project condition modeled. The bottom line is that, according to preliminary results, forebay levels coming downstream from Boundary and Box Canyon are the major factor in TGP levels below Waneta. The Waneta expansion project is expected to produce a 2%-5.2% reduction in TGP levels at the border, except in the highest runoff years. There is definitely a benefit, in other words, Matthews said. Schneider asked Matthews to provide copies of the Waneta environmental assessment to the TGG once it is available; he agreed to do so. Schneider said the TGG will likely want to develop group comments on this document. Matthews added that it is somewhat uncertain when the Waneta expansion might come on-line; Waneta is a marginally profitable project, and Columbia Power is currently undergoing a restructuring, with the Columbia Basin Trust selling their half of CPC to B.C. Hydro. The decision on whether or not to proceed with the Waneta expansion will ultimately be made by B.C. Hydro.

4. CRIEMP Update on TGP Monitoring.

Bill Duncan touched on the following major Columbia River Integrated Environmental Monitoring Program topics:

- CRIEMP history and study area (map)
- CRIEMP members
- CRIEMP's purpose and goals – integrate and coordinate environmental monitoring programs, develop partnerships etc.
- CRIEMP's guiding principals
- CRIEMP subcommittees, including the TGP subcommittee, formed in 1995
- CRIEMP TGP studies, including the Kootenay River and Keenleyside Dam 1999 investigations and the Libby Dam 2002 investigation
- CRIEMP temperature studies – 11 thermograph sites maintained along the Columbia, Kootenay and Pend Oreille rivers
- Future CRIEMP TGP studies – the Cumulative Effects Assessment, continuous and spot monitoring at various sites, future studies to check the assumptions of the existing Keenleyside model
- Contact Julia Beatty, CRIEMP chair, for further information (Julia.Beatty@gems4.gov.bc.ca)

There were no questions following Duncan's presentation.

5. USACE Albeni Falls/Pend Oreille Update.

- Kent Easthouse led this presentation. He touched on the following major topics:
- the installation of forebay and tailwater fixed monitoring stations at Albeni Falls, and

- subsequent monitoring
- the water temperature study in the Pend Oreille River
- details regarding the study period, equipment used and calibration of the fixed monitoring stations
- an aerial photo showing the location of the FMS sites
- study conditions in 2004 – a low flow year, with peak inflows of 63 Kcfs and peak outflows of 52 Kcfs; spill occurred from May through June
- data completeness – TDG information was complete 97.3% of the time at the forebay station, but only 83.6% in the tailwater station, primarily due to vandalism
- 2004 monitoring results – highest tailwater TDG level recorded was 113% under 18 Kcfs spill; both forebay and tailwater temperatures exceeded the 22 degree C standard during July and August; considerable daily TDG and temperature swings between the forebay and tailwater stations
- conclusions/recommendations: essentially, that the forebay FMS appears to provide representative results, but the tailwater station needs to be moved.
- details on the 2004 temperature study upstream of Albeni Falls: background, objective and goals, monitoring sites (11 total), study period (May 1-November 1), equipment used, sampling design.
- maps showing the location of the temperature monitoring sites
- temperature data will be retrieved soon; data will then be QA/QCed and results will be released in report form in 2005

The group devoted a brief discussion to the depth of Lake Pend Oreille. Paul Pickett noted that Idaho has contracted with Portland State University to do some water temperature modeling in Lake Pend Oreille; he suggested that it might be useful for the Corps to coordinate with them for the purposes of this study.

6. Grand Coulee Update.

Dave Zimmer provided a presentation on recent TDG efforts at Grand Coulee. He noted that the Boundary station showed TDG levels of 110% through the July-August period, and 120% during June. Gas levels were higher below Grand Coulee during June and July. Various people have expressed concern about the August operation at Grand Coulee; he distributed a handout showing inflow, outflow and project elevation data for the month of August. Zimmer noted that the project was making good progress toward its drawdown limit until the third week of August; however, there was an unseasonable precipitation event in late August that caused the project to lose some ground. In order to reach elevation 1278 by August 31, the system had to be opened up; this caused some spill through the PUD system, and somewhat elevated TDG levels through the Mid-Columbia.

Chris Maynard suggested that there may be an opportunity to plan ahead, in future years, when similar rain events are in the offing; Jim Adams replied that, while the forecast predicted some rain, it did not predict precipitation on this scale. It was six weeks of continuous precipitation, which was very unexpected, added another participant – there really was no way to prepare for it. Sometimes these events just hit us harder than we expected, and we have to

adjust, Adams said. The Corps shared a graph showing Grand Coulee inflow and outflow during the period in question.

7. Grand Coulee Peaking and Releases in 2004.

This topic was covered during the previous agenda item.

8. Overview of 2004 Spill Season and Spill Deflectors Planning – Chief Joseph.

Easthouse said there are five monitoring sites associated with this project – one in the Libby tailwater, plus forebay and tailwater stations at Chief Joseph and Albeni Falls. He touched on the following major topics relative to Chief Joseph monitoring in 2004:

- equipment type
- FMS locations
- data completeness (96-100% of the data passed the QA/QC process in 2004)
- 2004 monitoring results (forebay exceeded 110% from the end of June through the second week in August; it exceeded 120% for only one hour in 2004; forebay temperatures exceeded the 16-degree CCT [Colville Confederated Tribes] standard from July 15-September 15, and the WDOE standard of 17.5 degrees C from August 1-September 15; tailwater temperatures exceeded the CCT standard of 18 degrees from August 1 through September 15)
- spill at Libby (none in 2004)
- TDG/temperature probe calibration information for 2004
- conclusions – data completeness was acceptable at every project except the Albeni Falls tailwater station; it should be moved, but the other stations are fine.
- with respect to the flow deflectors, modeling and design are completed, and plans and specs are underway. Contract will be awarded in January 2005, with completion and full operation by April 2008.

The group briefly discussed funding issues associated with Chief Joseph flow deflector construction; it was noted that the federal agencies are currently operating under continuing resolution, and a final budget award is not expected before November, after the U.S. presidential election.

9. Douglas County PUD Gas Abatement Plan.

Rick Klinge updated the group on Douglas County PUD's water quality monitoring efforts in 2004, and its gas abatement plan for 2005. He provided some information on average TDG levels at Wells Dam in 2004; he noted that Douglas is collecting only temperature and gas pressure information. He characterized 2004 as a fairly easy year, from a water quality standpoint, with flows in the 88% of average range. Tailwater TDG levels at Wells briefly reached 113% in early August; other than that, they were always well below the 115% standard. In general, it was a pretty good season, he said. Klinge also shared a graph showing daily average total river flow for power production, spill and bypass operations at Wells in 2004. The

peak day-average flow at Wells was 167 Kcfs, on June 29, well below the 7Q10 flow of 242 Kcfs. Klinge briefly described Douglas' water quality plans for 2005, noting that the PUD is working with an engineering firm to optimize its operational and project configurations to minimize TDG production.

10. Chelan County PUD Gas Abatement Plan.

Waikele Hampton said there isn't much to report for Chelan County PUD; there were zero days of exceedence at Rocky Reach or Rock Island in 2004. With respect to the spill program under the HCP, which requires certain levels of project survival, spill for chinook and steelhead was reduced to zero at Rocky Reach in the spring of 2004 through the use of the project's bypass system. The project did spill 24.9% for sockeye and 9 percent for subyearlings. At Rock Island, spill, the primary means of juvenile passage, was targeted at 20%, which still produced no days of exceedence. Hampton said Chelan is looking at a combined surface/submerged spill gas abatement option for Rock Island; involving the installation of additional gates, that will be tested in the spring of 2005. However, this option cannot be fully implemented prior to the conclusion of the HCP survival study in the spring of 2006.

11. Grant County PUD Gas Abatement Plan.

Sharon Churchill reported that, at Wanapum, Grant plans to continue spill operations to manage TDG to standards, continue operation of deflectors, install advanced turbines in 2005-2012, and install fish bypass 2006-'08. There are similar plans, on a slightly different schedule, at Priest Rapids. She described the locations of the various FMS operated by Grant County; she then described the advanced turbine design plans at these projects in some detail, noting that these improvements are designed to provide higher fish survival, higher unit efficiencies and lower dissolved gas. Churchill said the first advanced turbine will be installed at Wanapum by January 2005. With respect to the new fish bypass and planned Unit 11, Churchill provided various diagrams showing the proposed design, and described the attributes of this project, including enhanced smolt survival through decreased spill. In response to a question, Cliff Sears said some survival studies are planned in conjunction with these projects.

12. Overview of 2004 FCRPS Spill Season.

Jim Adams gave the TGG an overview of the Corps' water quality monitoring efforts during the 2004 spill season; he touched on the following major topics:

- The Corps operates 29 FMS in the FCRPS; two of these stations – Albeni Falls forebay and Cascade Island below Bonneville – were new in 2004; data from these stations is available via the Corps website
- Days of spill, with start and end dates, at all 10 federal projects
- Comparison of exceedences with previous years – relatively few in 2004, compared to previous years, to be expected given the low water year
- Types of exceedences
- Total exceedences at various projects, 1999-2004

- TDG exceedences at Dworshak in 2004
- Day-average TDG levels at Dworshak, April 1-September 28, 2004
- TDG levels during the Lower Granite outage, September 20-26, 2004
- Decision support SYSTDG – in-season spill management of TDG
- The SYSTDG homepage
- Sample outputs from SYSTDG
- Dworshak summer operations – spill, total outflow, TDG and temperature
- McNary tailwater temperatures through the season, 2004 – somewhat warmer than the average over the last five years

There were no questions following this presentation.

13. The Natural Columbia “Native River.”

Bill Layman described his book, *The Native River*, and provided a fascinating presentation on the same topic. Layman thanked the TGG for the opportunity to speak to such a knowledgeable audience; he described how he, a native of Dayton, Ohio, came to be a historian of the Columbia River. He noted that his interest had originally been piqued by a photograph of Celilo Falls. Layman showed a series of historical photographs, and described the central importance of the Columbia for native peoples, noting that, today, it is essentially two rivers: the working river, and the spiritual river. He described his efforts as one person’s attempt to bring back the images and stories of the river, so that modern people can hold these images and stories in their hearts, and begin to imagine the Columbia as it once was, because the number of people who can remember the river as it was before dam construction began in the 1930s is now sadly diminished.

Layman noted that he is working on a book and an exhibit using these and other images: *River of Memory: The Everlasting Columbia*, which will travel to museums around the region. The group offered a series of questions and comments, about the riverboat trade, accounts of historical exploration in the region, the historical TDG and temperature regimes in the river, the emotional impact of these images of the river as it used to be, before human development, and how the exhibit might help heal the deep wounds caused by the inundation of traditional Native American fishing and cultural sites. He invited the TGG to schedule its April 2006 meeting in Wenatchee, because that is where and when the exhibit will be opening.

14. Okanogan River Flow Management Model.

Klinge introduced Kim Hyatt of the Department of Fisheries and Oceans, noting that this is a true cooperative multiyear program between three Canadian parties and Douglas PUD. Hyatt led a presentation titled “The Fish and Water Management Tools Program (FWMT): Increasing Sockeye Production Through Improved Flow Management in the Okanogan River.” Hyatt touched on the following major topic areas:

- Okanogan Lake – physical characteristics
- Okanogan Lake – hydrology

- Okanagan Lake Dam – how are release patterns determined?
- The Okanagan Basin Agreement
- Inflow forecasts
- Okanagan Lake Reservoir System (OLRS) operations – an overview
- Operator challenges – natural variability of natural freshet volumes, uncertainty of inflow volume forecasts, limited river channel capacity, limited discharge capacity of dams etc.
- The multiple threats to the persistence of Okanagan sockeye – urbanization, erosion/sedimentation, channelization, climate change, water quality, physical quality, pollutants, dams and barriers etc.
- Definition and origins of the FWMT project
- The Glenfir Report – highlighted deviations from the Okanagan Basin Water Agreement flows for fish (graphs)
- Structure and science foundations of the FWMT decision system: geographic scope, FWMT components, temporal scope
- The regional hydrology sub-model
- The importance of Okanagan Lake kokanee as an indicator of FWMT performance
- The sockeye sub-model requires annual information on spawn timing, redd distribution by sub-habitat, spawner density and redd deposition
- Time to egg and fry emergence determine the interval sockeye are at risk to production losses from drought and dessication or flood and scour in a given year
- Dessication or flood-and-scour processes control incubation and emergence success of sockeye eggs and alevins
- Water management “rules” 6, 7, 8, 9 from the Canada-BC Okanagan Basin Water Agreement
- FWMT and density-dependent rearing limitations in Osoyoos Lake
- The temperature-oxygen “squeeze” and density-dependent rearing limitations in Osoyoos Lake
- Density-dependent vs. density-independent mortality and water management “rule” #10
- FWMT anticipates water management opportunities to avoid fish and property losses under a wide range of annual water supply conditions
- The OKFMW decision support system – what is it, key concepts, how it works, results

Hyatt said this approach has been fully embraced by all of the parties to the OKFMW; it will be implemented beginning this year. In response to a question from Pickett, Hyatt said the Okanagan model does produce a range of probable outcomes.

15. TMDL Update.

Mary Lou Soscia said EPA is engaged in a number of important water quality efforts in the Columbia basin. She introduced the many TGG participants with whom she has worked closely on these efforts, by name. Soscia referenced on the positive nature of the TGG relationship, then touched on various EPA water quality improvement projects in the Columbia basin: first, with respect to TDG. The final TDG TMDL for the Lower Columbia was completed in 2003; the final TDG TMDL for the Lower Snake was also completed in 2003. On the temperature front, this work was somewhat delayed; EPA is having conversations with the three

states and others about re-starting that work in November 2004. The states are exploring the use/attainability analysis under the Clean Water Act. On the toxics front, Soscia said that many TGG participants know of the work in Lake Roosevelt; the preliminary site assessment is now complete, and it is hopeful that resolution will be reached and will be able to move forward to alleviate that problem, and human exposure to toxics. Also, she said, EPA has been working on a study examining the toxic content in fish caught in the Lower Columbia; EPA is trying to understand where toxics are coming from and how they're getting into the fish. EPA is also contemplating a Lower Columbia TMDL for certain toxics, she said. EPA will keep the TGG informed on these subjects at future meetings, she said, adding that, in EPA's view, the TGG remains an exceptional information-sharing group.

Helen Rueda addressed EPA's work in the Pend Oreille and Mid-Columbia systems; she went through a series of slides on the topic of the now-approved Lake Roosevelt/Mid-Columbia TMDL and implementation plan. We are now starting work on the Pend Oreille temperature/TDG TMDL, a joint project between EPA, WDOE and the Kalispell Tribe. Data collection is already underway, and some results will be shared at the next TGG meeting. The first draft of the Pend Oreille TMDL should be available by the spring of 2005, added OUL Pickett.

16. TGG Website Update.

Chris Maynard said that, following the last TGG meeting, a subgroup had been convened to explore the possibility of an independent TGG website. The subcommittee discussed the specific kinds of information that would be most useful to display, and the logistics of acquiring a domain name and maintaining the site. Ultimately, the subcommittee concluded that it would likely be simpler to modify the TGG's existing website, and re-organize it in a way that makes sense. Maynard used the overhead projector to demonstrate the proposed format the subgroup is suggesting, which includes links to maps and pictures of the transboundary area, members and updates on gas work, studies, meetings and presentations.

The group devoted a few minutes of discussion to the subgroup's proposed re-design of the TGG website, offering a variety of clarifying questions and comments. One suggestion was that access to the website be simplified; Schneider agreed, and distributed a schematic explaining how to access the site. Ultimately, the TGG endorsed the website redesign concept the subgroup is suggesting. The subgroup will ensure that it is on-line prior to the next TGG meeting.

17. TGG Statement on TGG Diversification for B.C./Washington Environmental Cooperation Council (ECC).

Schneider said this topic was discussed at the group's last meeting. At that meeting, it was decided that diversifying the TGG to include topics other than gas was not generally supported. Schneider said he had then drafted a statement to the ECC, explaining the TGG's views on their diversification request. He distributed copies of this statement, and asked the TGG to provide any comments they may have to him by October 31, after which he will incorporate any comments received and send it to the ECC. It was so agreed.

18. Next TGG Meeting Date and Location.

The next TGG meeting was set for Sandpoint, Idaho on April 20-21 (tentatively). It was agreed that the agenda may include:

- Pend Orielle bull trout
- TDG issues in sturgeon recovery
- Overview of Lower Granite/Ice Harbor Removable Spillway Weir (RSW) Technology – Bill Hevlin
- GBT experience in transboundary waters – Dr. Al Scholz
- Review and Comment on Waneta Environmental Assessment
- Idaho WQ Group?
- Rocky Reach Gas Abatement (Surface/Submerged Spill) Plan for 2005 – Chelan County PUD, Waikele Hampton
- Operations experience/investigations of advanced turbine and juvenile fish survival studies designed for Wanapum and Priest Rapids Dams – Grant County PUD, Sharon Churchill
- Lower Columbia River Toxics TMDL – Helen Rueda
- Pend Orielle Temperature and TDG TMDL Draft -- TGG Review and Comment-Helen Rueda

Possible tour destinations include the Chief Joseph flow deflectors (depending on the construction schedule), the Long Lake project, the McNary fish transportation facility, and the Ice Harbor RSW.

Meeting summary prepared by Jeff Kuechle.